EPA Region 7 TMDL Review

TMDL ID:	KS-KLR-02-W130_9	**Waterbody ID:**	KS-KLR-02-W130_9009, KS-KLR-02-W130_87, KS-KLR-02-W130_91, KS-KLR-02-W130_92, KS-KLR-02-W130_9, and KS-KLR-02-W130_86
Waterbody Name:	Soldier Creek Watershed		
Tributary:	Little Soldier Creek (9), Dutch Creek (92), Walnut Creek (91), James Creek (87), Little Soldier Creek (9009), and Crow Creek (86)		
Pollutant:	Biology: Sediment Impact on Aquatic Life		
State:	KS	**HUC:**	10270102
BASIN:	Middle Kansas Sub Basin; Kansas/Lower Republican River Basin		
Submittal Date:	1/9/2007		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

The TMDL for the Soldier Creek Watershed was formally submitted by the Kansas Department of Health and Environment (KDHE) in a letter received by EPA on December 11, 2006. The public comments and KDHEs response to those comments were formally submitted by KDHE in a letter received by U.S. Environmental Protection Agency (EPA) on January 9, 2007. Revisions to the TMDL were received by email and dated February 26, 2007.

The Soldier Creek Watershed is not on the current 2004 303(d) list and is listed in the proposed 2006 303(d) list in the 4A category for TMDLs written. It was listed on the 1996 303(d) as impaired for total suspended solids (TSS), but then was delisted on the 1998 303(d) list for TSS. EPA is documenting approval of these TMDLs, although the waterbodies represented in this document are not listed as impaired on the current 303(d) list.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

This TMDL links the narrative standard with the macroinvertebrate biological index (MBI), the ephemeroptera, plecoptera, trichoptera (EPT) index, and Kansas Biotic Index (KBI) scores reported as the nutrient oxygen demand component, as well as an EPT % Abundance score. All biological monitoring metrics scores were evaluated for Station 299 near Hutchison over the period of record (1985-2004). TSS increases logarithmically with increasing flows.

The loading capacity (LC) is identified as a load allocation (LA) of < 100 mg/L total suspended solids (TSS) and a 35% reduction in TSS from current averages, and a waste load allocations (WLAs) for the City of Soldier of TSS concentrations maintained under 80 mg/L, which should result in a fully supporting the Expected Aquatic Life Support designated use as indicated by MBI, KBI, EPT, and EPT % Abundance biological indices scores. Meeting these targets should result in attainment of water quality standards (WQS).

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Designated Uses:

Expected Aquatic Life Support	Drinking Water Supply	Food Procurement	Groundwater Recharge
Irrigation Water	Industrial Water	Livestock Water	

Impaired Use: Expected Aquatic Life Support on segments 9 and 9009

Water Quality Standard: Suspended solids - Narrative: Suspended solids added to surface waters by artificial sources shall not interfere with the behavior, reproduction, physical habitat or other factor related to the survival and propagation of aquatic or semi-aquatic or terrestrial wildlife. (KAR 28-16-28e(c)(2)(D)).

Desired endpoint: TSS levels below 100 mg/L for flows less than 1000 cfs.

Biology:
MBI score Fully Supporting ≤ 4.5
KBI score Fully Supporting = 2.6
EPT score Fully Supporting = 13
EPT % Abundance score Fully Supporting $\geq 48\%$

The state deems these conditions as not complying with their narrative WQS. The State of Kansas does not have numeric criterion for TSS in their WQS. The creek exceeded the narrative WQS which states that "water shall be free from" aesthetically objectionable conditions.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The State of Kansas does not have numeric criterion for TSS in their WQS.

The target is an expressed link to the narrative standards. Decreased solids loads should result in aquatic communities with larger proportions of their populations comprising pollution intolerant species, indicative of improved water quality.

The LC is identified as a LA of < 100 mg/L TSS and a 35% reduction in TSS from current averages with a WLA for the City of Soldier of TSS concentrations maintained under 80 mg/L, which should result in a fully supporting the Expected Aquatic Life Support designated use as indicated by MBI, KBI, EPT, and EPT % Abundance biological indices scores.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

NPDES: There is one NPDES facility discharger to the Upper Soldier Creek, the City of Soldier. The current permit (M-KS70-OO01; KS0081035) is in effect from November 1, 2005 to October 31, 2010 and has a TSS limit of 80 mg/l monthly average with a weekly average of 120 mg/l. Since 2004, Soldier has discharged an average TSS of 33 mg/l and never has exceeded its permit limits.

In September 2005, EPA issued two permits for facilities of the Prairie Band Potawatomi Nation (KS0096199 and KS0096202). The first facility influences Soldier Creek below the area of concern for this TMDL. The second enters the stream within the TMDL area of concern. The second facility has average TSS permit limits of 30 mg/L monthly and 45 mg/L weekly.

Contributing Runoff: The watershed has an average soil permeability of 0.6 inches/hour according to NRCS STATSGO data base. Runoff would be produced under storms ranging in duration from one to six hours, having a recurrence interval of five, ten or twenty five years. Runoff is chiefly generated as infiltration excess with rainfall intensities greater than soil permeabilities. Generally, 86 percent of the watershed would generate runoff under dryer conditions. Moderate or wet conditions (larger storms) would see runoff contributed from 90 and 98 percent of the watershed respectively.

Major channelization and resulting degradation of the streambed are reported as confined currently to the areas south of Rocky Ford on the Prairie Band Potawatomi Reservation, though this limit on downcutting is not expected to be permanent. Other smaller efforts upstream, including road construction activities have been recorded as causing smaller downcutting effects upstream of the reservation. Intact riparian corridors reduce suspended solids loads by strengthening channel banks, which reduces their susceptibility to erosion, and by intercepting solids loads from overland flow. No background levels were calculated for this TMDL because suitable, unimpacted stream segments were not available for analysis.

All sources for sediment impact on Expected Aquatic Life impairment due to biology have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

There is an indirect, yet un-quantified relation between solids loading and biological integrity. Decreased solids loads should result in aquatic communities with larger proportions of their populations derived from pollution intolerant orders, indicative of improved water quality. The relative presence of point and non-point activities has to be assessed for relative contributions and responsibilities for sediment load reduction in the watershed. Therefore, allocations are made for this TMDL to direct appropriate action to reduce sediment loads which will yield improved MBI and EPT values.

WLA Comment

The City of Soldier uses a lagoon system with permit limits for TSS it may discharge 80 mg/l on a monthly average. Adherence to this limit will not cause impairment to stream or its biology. Based on the assessment of sources, point sources do not contribute to impairment of water quality relative to sediment impacts on stream biology. At this point, the WLA will be maintenance of TSS loadings from point sources such that average monthly TSS concentrations are maintained below 80 mg/l, leading to in-stream concentrations below 100 mg/l at flows below 1 cfs.

City of Soldier WWTF; limit of TSS $\leq$80 mg/L resulting in a WLA of 12.7 lbs/day.

LA Comment

The LA is set at < 100 mg/L TSS and a 35% reduction in TSS from current averages resulting in a LA of 16,180 lbs/day at 50% flow exceedance at 30 cfs.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The MOS is implicit and established by use of multiple biological indices. Therefore, in addition to the endpoint of greater than 48% abundance of EPT organisms, an average MBI below 4.5 should be seen and the percentage of EPT taxa should average greater than 25%. Since the impairment was originally cited based on the condition of the biological community, use of the three indices confirms that the macroinvertebrate indicators are consistent with good water quality and full support of the aquatic life use of Upper Soldier Creek.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Sampling occurs during open water season (April to November) within aquatic stage of the life cycle of the macroinvertebrates. There are no described seasonal variations of the desired endpoint of this TMDL. All flow conditions, including seasonal variation, are taken into account for TMDL calculations. The targets should result in WQS attainment, regardless of the season.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public Notice: Public notification of the second round of TMDLs in the Kansas-Lower Republican Basin was made in the Kansas Register in January 5, 2006. An active Internet Web site was established at http://www.kdheks.gov/tmdl/ to convey information to the public on the general establishment of TMDLs, and the specific TMDLs for the Kansas-Lower Republican Basin.

Public Hearing: Public Hearings on the second round of TMDLs for the Kansas-Lower Republican Basin were held in Olathe on January 19, 2006 and in Topeka on January 30, 2006.

Basin Advisory Committee: The Kansas-Lower Republican Basin Advisory Committee met to discuss the second round of TMDLs in the basin on April 7, 2005 in Lawrence, July 26, 2005 in Concordia, October 20, 2005 in Lawrence and January 24, 2006 in Topeka.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will collect seasonal biological samples from Soldier Creek for three years over 2007- 2011, and an additional two years over 2012-2015 to evaluate achievement of the desired endpoint. Periodic monitoring of sediment content of wastewater discharged from treatment systems will be expected under reissued NPDES and state permits. Additional source assessment needs to be conducted and local program management needs to identify its targeted participants of state assistance programs for implementing this TMDL. This information should be collected in 2006-2007 in order to support appropriate implementation projects.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

For the two point sources in the watershed, the WLA assigned should be sufficient. Therefore, reasonable assurances are not required. Reasonable assurance, although not required, also include numerous authorities and funding through the Kansas Water Plan.